

WE CLAIM:

1. An apparatus for verification of redundant functions on a circuit, comprising:
 - a circuit function block having nodes, the nodes arranged to access each of the redundant functions on the circuit;
 - a test interface circuit including an input and an output, the input arranged to receive an input signal, and in response to the input signal, supply a test signal, indicating a function on the circuit to test, and
 - the circuit function block arranged to receive the test signal, and in response to the test signal couple at least one of the nodes within the circuit function block to the output test interface such that the function may be tested.
2. The apparatus of Claim 1, wherein the circuit function block, further comprises:
 - a functional block, arranged to receive the test signal, and in response to the test signal couple at least one node within the functional block to the output of the test interface such that the function may be tested; and
 - a redundant functional block, arranged to receive the test signal, and in response to the test signal couple at least one corresponding node to the output of the test interface such that the function may be tested, the at least one corresponding node accessing the same relative location within the redundant functional block as the at least one node within the functional block.
3. The apparatus of Claim 2, further comprising, a controller circuit arranged to receive the test signal and in response to the control signal selectively couple the at least one of the nodes within the functional block and the at least one of the corresponding nodes within the redundant functional block to the output of the test interface.

4. The apparatus of Claim 3, wherein the test interface comprises a plurality of input pins and a plurality of output pins, each of the input pins arranged to receive the test signal, and each of the output pins arranged to provide an external signal.

5. The apparatus of Claim 4, wherein the test interface further comprises:
an input test interface arranged to receive the input signal and output the test signal; and
an output test interface arranged to output the external signal.

6. An apparatus for redundant function verification for an integrated circuit, the circuit a mixed signal circuit and configuration, control and testing circuitry for the mixed signal circuit, comprising:

a protocol logic interface circuit arranged to receive a control signal and arranged to activate a test mode within the circuit in response to the control signal, the test mode arranged to test a functional block and a redundant functional block within the circuit;

a mixed signal circuit including access lines to internal nodes and external nodes of the integrated circuit; the internal nodes and the external nodes selected in response to the test mode;

a switch circuit coupled between output pins and the internal and external nodes, respectively, the switch circuit arranged to connect the internal nodes and external nodes to the output pins in response to the test mode to test the functional block and the redundant functional block within the circuit.

7. The apparatus of Claim 6, further comprising, a memory circuit arranged to store configuration information in response to the test mode.

8. The apparatus of Claim 7, wherein the protocol logic interface circuit, further comprises:

a lock enable circuit arranged to receive a lock enable signal;

a lock circuit coupled to the lock enable circuit and arranged to receive the lock enable signal and produce a valid key signal in response to the lock enable signal.

9. The apparatus of Claim 8, further comprising a decoder circuit, the decoder circuit coupled to the lock circuit and arranged to receive the valid key signal and the control signal, the decoder circuit arranged to configure the test mode in response to the valid key signal and the control signal.

10. A method for verifying redundancy of a functional block within a circuit, comprising:

- (a) creating a test to verify the redundancy of the functional block within the circuit;
- (b) performing the test to verify the redundancy of the functional block within the circuit; and
- (c) determining if the functional block circuit passed the test.

11. The method of Claim 10, further comprising, when the functional block passed the test approving the circuit, otherwise, rejecting the circuit.

12. The method of Claim 11, wherein performing the test to verify the redundancy of the functional block within the circuit, comprises performing the test on each of the corresponding functional blocks that are redundant within the circuit.

13. The method of Claim 12, wherein performing the test to verify the redundancy of the functional block within the circuit, further comprises:

- coupling at least one test mode pin to a node within the circuit based on the test; and
- performing the test through the use the at least one test mode pin.

14. An apparatus to verify the redundancy of functions included on an integrated circuit with a mixed signal circuit and configuration, a control and testing circuit for the mixed signal circuit, comprising:

input terminals arranged to convey input signals and configuration control signals;

interface terminals arranged to convey the interface signals and analog interface signals;

an interface circuit coupled to the input terminals that is arranged to provide configuration data and switch control signals in response to the configuration control signals, the configuration; and

an analog circuit with redundant functions, the analog circuit including internal nodes and external circuit terminals within each of the redundant functions, coupled to the interface circuit, that is arranged to communicate internal analog signals and external analog signals via the internal nodes and external circuit terminals to each of the redundant functions, in response to a portion of the configuration data.

15. The apparatus of Claim 14, further comprising:

a switching circuit that is arranged to alternately couple respective ones of the internal and the external circuit terminals in response to the switch control signals;

wherein respective ones of the internal analog signals and the external analog signals change in response to corresponding changes in respective ones of the portion of the configuration data.

16. The apparatus of Claim 15, further comprising a memory circuit, coupled to the interface circuitry and the analog circuit, that stores the configuration data.

17. The apparatus of Claim 14, wherein the interface circuitry comprises a data decoding circuit that is coupled to the input terminals and decodes the configuration control signals and is arranged to provide the configuration data and the switch control signals.

18. The apparatus of Claim 17, wherein the interface circuitry further comprises, a lock decoding circuit that is coupled between the input terminals and the data decoding circuit that is arranged to enable and disable the data decoding circuit in response to the configuration control signals.

19. The apparatus of Claim 18, wherein the switching circuit comprises a plurality of switch circuits.

20. The apparatus of Claim 17, further comprising, a mode control circuit, coupled to the interface circuit and provides the test mode control signals in response to the enablement of the data decoding circuit.

21. An apparatus for verifying redundancy of a function on a circuit, comprising:

a means for accessing a plurality of occurrences of the function on the circuit;

a means for performing at least one test to verify the redundancy of the function on the circuit;

a means for determining if the plurality of the occurrences of the function on the circuit passed the at least one test.

22. The apparatus of Claim 21, further comprising, when the plurality of the occurrences of the function on the circuit passed the at least one test, a means for approving the circuit, otherwise, a means for rejecting the circuit.